Background: To ensure a timely diagnosis of RA, diagnostic US is increasingly being utilized to detect subclinical pathology in order to implement treatment plans rapidly. There are several optimal synovitis scoring protocols in the literature but a consensus regarding a definitive system still eludes us. There are few studies that have focussed specifically on wrist US pathology in early RA. Hence, we assessed what the common wrist US pathologies are in patients diagnosed with early RA.

Objectives: To identify the patterns of wrist US abnormalities seen in patients diagnosed with early RA from our EIA service in a large urban London hospital.

Methods: Retrospective service review of patients seen in the EIA US diagnostic service at Croydon Health Services in South London. Patients diagnosed with RA (EULAR/ACR 2010 criteria) with wrist US synovitis/tenosynovitis (EULAR-OMERACT definitions) between Jan2017-Dec2018 were included. The US protocol in the EIA diagnostic service includes lateral and dorsal (long axis & short axis views) of the ulnar carpals (UCJ) & radiocarpals (RCJ) joints with views covering the radioulnar joints & ulnar styloids and views of the extensor & flexor tendons. Images and reports were reviewed and correlations with rheumatoid factor (RF), anti-CCP antibodies (CCP), CRP & ESR were also assessed.

Results: 86 patients with RA (meeting EULAR-ACR criteria) were found to have wrist pathologies on US. The commonest finding (36%) was moderate (grade 2) greyscale (GSUS) synovitis in the UCJ with almost all having moderate (grade 2) power Doppler (PDUS) synovitis (32%). Only a few (5/86) had more severe pathology with GSUS/PDUS (grade 3). 22% (19/86) had milder changes GSUS grade 1 with three quarters of these patients having concomitant PDUS signal. Just under 10% had RCJ US synovitis and 3 cases had radioulnar joint synovitis. Only 6% of the cohort had whole wrist joint involvement. Erosions were very uncommon (2/86). In total just under 25% (21/86) had tendon disease with roughly 70% affecting 1 tendon compartment and the others affecting 2 or more. Of those with tendon pathology, the two most commonly affected tendons were the 2nd [48% (10/21)] and 4th [38% (8/21)] extensor compartments. Extensor tenosynovitis was more common than flexor (26 vs 4 cases). US synovitis ‘only’ was seen in 76%, US tendinosis ‘only’ in 7% and concomitant pathology in 17%. Correlation with inflammatory markers was not seen with only 3 patients presenting with significantly elevated CRP (>15) and ESR (>20). Though CCP was more commonly seen compared to RF (32% vs 17%), just over half did not have positive antibodies.

Conclusion: Our observational study found that in early RA, mild-to-moderate GSUS and PDUS in the UCJ is the commonest wrist US pathology with tenosynovitis of the 2nd and 4th extensor compartments. Severe disease and erosions were very uncommon. The pattern of these US wrist pathologies are likely to reflect the initial disease course of these patients that present to our EIA service (i.e. early RA patients). Furthermore, biochemical markers do not seem to be useful in these patients and serology may not be present in over 50%. Therefore, clinicians who are running EIA diagnostic services with US should be expectant of milder-to-moderate US findings when diagnosing early RA and not be misled by the absence of more severe findings. Our understanding of US pathologies in the RA disease course therefore needs to be more nuanced and further work in other specific joint areas may help to elaborate what US pathology is most common in early RA.

Disclosure of Interests: None declared.

Morphological and biochemical MRI of radiocarpal cartilage could be helpful to differentiate between RA and OA patients. Both, RA and OA, are associated with cartilage damage measured by morphological MRI of the hand. Hence, OA was associated with more loss of cartilage integrity compared to RA using biochemical MRI, whereby only early RA patients were analyzed in this first evaluation. Non-contrast-agent morphological and biochemical MRI could be a non-invasive tool to investigate cartilage integrity in RA and OA patients and could help to differ disease pattern in the future.

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### THE PHYSIOLOGICAL FINGER JOINT ARCHITECTURE - AGE-RELATED INCREASE OF EROSIONS AND OSTEOPHYES IN THE JOINTS OF HEALTHY INDIVIDUALS

#### Background

The “normal” finger joint architecture has not yet been defined and could change in the course of life. Therefore the objective was to assess the physiological finger joint architecture of healthy individuals and the relation of structural changes to age and sex.

#### Objectives

The objective was to assess the physiological finger joint architecture of healthy individuals and the relation of structural changes to age and sex using high-resolution quantitative computed tomography (HR-pQCT) of the hands.

#### Methods

Healthy individuals without rheumatic diseases and other comorbidities were recruited through a field campaign and received HR-pQCT examination of the Metacarpalphalangeal 2/3 and Proximal Interphalangeal 2/3 joints of one hand. The number of erosions and osteophytes was quantified across different sexes and age decades (6 decades within the age range of 21-80 years).

#### Results

120 healthy individuals (10 women and 10 men in each decade) were recruited. Bone erosions [median (Q1-Q3), 1 (0-2)] and osteophytes (2 (1-4)] were found in both sexes without significant differences. However, structural changes increased with age: the overall incidence rate ratio (IRR) for the number of erosions and osteophytes per age were 1.04 (95% CI 1.03-1.06), 95% CI 1.03-1.05), which indicates a 4% increase in the number of erosions and osteophytes per year. The use of the 3rd decade as the reference demonstrated that individuals in the age decades from 50 years had higher IRR for erosion number (6th, 7th, 8th decade: 4.87 (2.20-11.75), 6.81 (3.08-16.46) and 6.92 (3.11-16.79)) compared to younger subjects (4th, 5th decade: 1.80 (0.69-4.87), 1.53 (0.59-4.10)). The IRRs of osteophytes also indicate a progressive increase after the fifth decade, with IRRs of 2.32 (1.32-4.17), 4.17 (2.38-7.49) and 6.86 (3.97-12.20) for the 6th, 7th and 8th decades, respectively.

#### Conclusion

Structural changes in the finger joints of healthy individuals are age-related. While being rare under 50 years of age, erosions and osteophytes accumulate above the age of 50, suggesting that the threshold between “normal” and “pathological” shifts with increasing age.

**REFERENCES:**